

MECHATRONICS BOOK SERIES

CONTROL AND INTELLIGENT SYSTEMS

Momoh Jimoh E. Salami
Abiodun Musa Aibinu
Yasir Mohd Mustafah



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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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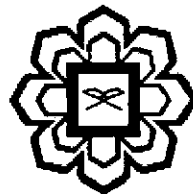
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EDITOR

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Chapter 31

Intelligent Water Heater System

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31.1 Introduction

Water heater is profoundly used by many users throughout the world whether for domestic or industrial usage. Typical domestic uses of hot water are for cooking, cleaning and bathing, and space heating while for industrial use, both hot water and water heated to steam have many uses. Domestic use of hot water heating system with the focal point being on the design of a water heater system for bathing or showering purposes. There are many types of domestic water heating system for showering purpose with different kinds of design and features. The systems kept improving from time to time but with the continuous advance in technology there are still room for improvement and the water heating system can be further develop for more convenience, efficient and ease of use for the users. Therefore, this project is done to design and build an intelligent water heating system which will provide the users with a constant and good flow of water at their desired temperature without wasting a large amount of time.

With the focus on the users in Malaysia, there are a large number of water heater users with perhaps, almost all houses having at least one of such system. However, they may differ in types, sizes, design and quality of hot water they produced. Some of them use the tank-type water heater which maintains the hot temperature of water in a large tank by constantly heating the water. The hot water then will be ready for use at any time by the users with a good flow of hot water with a constant temperature. However, the drawback of this system is that, it consumes a lot of energy in order for the water in the large tank to be kept in high temperature all the time. In addition, the user will have the difficulty of finding the right mixture amount of hot and cold water in order to get their desired water temperature.

Another type of common water heating system that can be found is the instantaneous or tankless water heater which is usually attached to the wall in the bathroom. It heats the water to the desired user temperature there and then when the water flows through the heater. The problems with this system are the low and sometimes inconsistent water pressure. Besides, the user might not get his/her desired water temperature because the device only heat the cold water once it is demanded and flow through it and therefore, the output water might not be heated properly and correctly to the desired temperature.

Hence, this work aim at designing an intelligent water heating system that can produce a constant and good flow of output water at the desired temperature level by using the Fuzzy Logic Controller.

31.2 System Description & Design

The mechanical system of this project is shown in Figure 31.1. It integrates all the selected components previously discussed. Here, we will discuss the features of the design. First of all, the tank is made by clear Perspex material. We choose this material because clear